



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

**Released Items  
2005**

**Grade 7  
Mathematics**

# Mathematics

- ❶ In an election, for every 4 people who voted for Mr. Smith, 1 person voted for Mr. Jones. Which fraction of the votes did **Mr. Smith** receive?

A.  $\frac{1}{4}$   
B.  $\frac{1}{5}$   
C.  $\frac{3}{4}$   
D.  $\frac{4}{5}$

- ❷ Angie has \$5.00 to buy as many peaches as possible. She knows that the price of peaches is \$0.89 or \$0.99 per pound. What is the best estimate of the number of pounds of peaches Angie can buy?

A. less than 1 pound  
B. between 4 and 5 pounds  
C. between 5 and 6 pounds  
D. between 8 and 9 pounds

- ❸ Mr. Taylor is buying one granola bar for each of his students.

- There are 30 students.
- There are 6 granola bars in each box.
- The price of a box of granola bars is \$2.16.

What is the total cost of the granola bars?

A. \$ 6.48  
B. \$10.80  
C. \$12.96  
D. \$64.80

- ❹ A polygon has **no** congruent sides. Which kind of polygon **could** it be?

A. rectangle  
B. rhombus  
C. square  
D. trapezoid

- ❺ A tire on a car measures 16 inches from where it touches the ground to the highest point on top of the tire. What is the radius of the tire?

A. 8 inches  
B. 16 inches  
C. 32 inches  
D. 48 inches

- ❻ Students are using string to make projects in art class.

- There are 200 students.
- Each student needs 75 centimeters of string.

How many **meters** of string are needed in all?

A. 1.5 meters  
B. 15 meters  
C. 150 meters  
D. 1500 meters

- 7 Jesse keeps a chart of how many miles she runs each day.

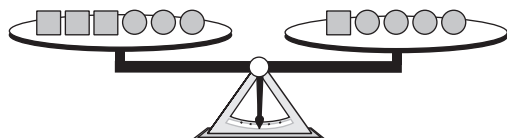
**Running Chart**

| Day                 | 1              | 2              | 3 | 4              |
|---------------------|----------------|----------------|---|----------------|
| Distance (in miles) | $1\frac{1}{2}$ | $1\frac{3}{4}$ | 2 | $2\frac{1}{4}$ |

If the pattern continues, how many miles will Jesse run on Day 6?

- A.  $2\frac{1}{2}$
- B.  $2\frac{3}{4}$
- C. 4
- D. 9

- 8 Look at this scale.



The scale is balanced.

Which does  $\bigcirc$  equal?

- A.  $\square$
- B.  $\square \bigcirc$
- C.  $\bigcirc \square$
- D.  $\square \square$

- 9 For the Book Club, Serena made a stem-and-leaf plot showing the number of pages each person read yesterday.

**Number of Pages Read Yesterday**

|   |         |
|---|---------|
| 0 | 5       |
| 1 | 0 2 2 2 |
| 2 | 6 7     |
| 3 |         |
| 4 | 7 8     |
| 5 | 0 2 3   |

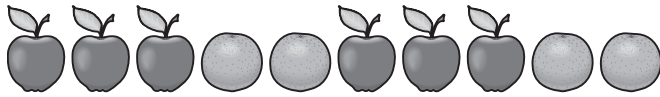
**Key**

2 | 7 represents 27 pages read

What is the median number of pages read?

- A. 12
  - B. 26.5
  - C. 29.5
  - D. 48
- 10 At a restaurant there are 5 kinds of pasta and 2 types of sauce. How many different ways can a customer order one kind of pasta and one type of sauce?
- A. 5
  - B. 7
  - C. 10
  - D. 20

- 11 Look at these oranges and apples.



What is the ratio of oranges to apples?

- 12 The manager of a restaurant uses the formula below to decide what to charge for a meal.

$$p = (f \div 3) \times 10$$

In the formula,  $p$  is the price, in dollars, that customers pay for a meal and  $f$  is the food cost to make the meal.

What is the price of a meal if the food cost is \$4.50?

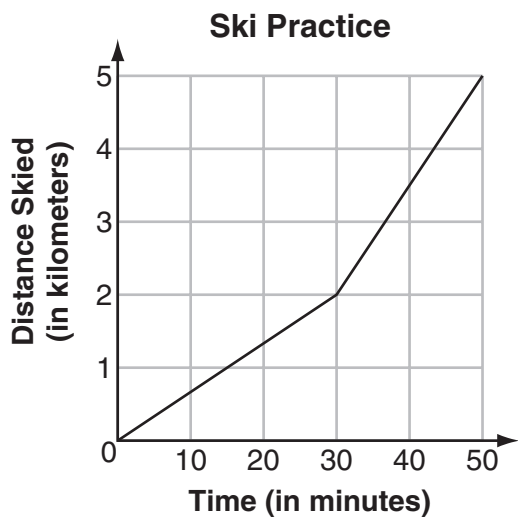
- 13 What is the greatest whole number value of  $n$  that makes this sentence true?

$$3^n < 100$$

Show your work or explain how you know.



- 14 The graph below shows the distance Ben skied during a 50-minute practice.



How does Ben's speed during the last 20 minutes of the practice compare with his speed during the first 30 minutes? Explain your answer.

- 15 Cal said, "All squares are similar to each other."
- a. Explain how you know whether Cal is or is not correct.

Stu said, "All rectangles are similar to each other."

- b. Draw two rectangles that prove that Stu's statement is **false**. Explain your answer.

## Grade 7 Mathematics Released Item Information

| Released Item Number        | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  |
|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Calculator Allowed          | ✓   |     |     | ✓   |     | ✓   | ✓   |     | ✓   | ✓   |     | ✓   |     | ✓   |     |
| Content Strand <sup>1</sup> | NO  | NO  | NO  | GM  | GM  | GM  | FA  | FA  | DP  | DP  | NO  | FA  | NO  | FA  | GM  |
| GLE Code                    | 6-1 | 6-3 | 6-4 | 6-1 | 6-6 | 6-7 | 6-1 | 6-4 | 6-1 | 6-4 | 6-1 | 6-3 | 6-2 | 6-2 | 6-5 |
| Depth of Knowledge Code     | 1   | 2   | 2   | 2   | 1   | 2   | 2   | 2   | 2   | 1   | 1   | 1   | 2   | 3   | 3   |
| Item Type <sup>2</sup>      | MC  | MC  | MC  | MC  | MC  | MC  | MC  | MC  | MC  | MC  | SA  | SA  | SA  | SA  | CR  |
| Answer Key                  | D   | C   | B   | D   | A   | C   | B   | D   | B   | C   |     |     |     |     |     |
| Total Possible Points       | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 2   | 2   | 4   |

<sup>1</sup>Content Strand: NO = Numbers & Operations, GM = Geometry & Measurement, FA = Functions & Algebra,  
DP = Data, Statistics, & Probability

<sup>2</sup>Item Type: MC = Multiple-Choice, SA = Short Answer, CR = Constructed Response



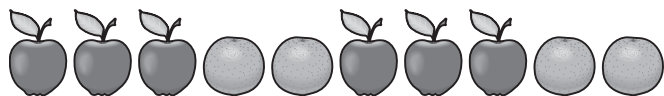
**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

**Released Items  
Support Materials  
2005**

**Grade 7  
Mathematics**

**NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS**

- 11** Look at these oranges and apples.



What is the ratio of oranges to apples?

**Scoring Guide:**

| Score | Description  |
|-------|--|
| 1     | correct answer, <b>2 to 3</b> , $\frac{2}{3}$ , or equivalent  |
| 0     | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | no response  |

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 1 (EXAMPLE A)

$$\frac{4}{6}$$

Student gives answer equivalent  
to  $\frac{2}{3}$ .

SCORE POINT 0 (EXAMPLE A)

$$\frac{4}{10}$$

Student's answer is incorrect.

SCORE POINT 0 (EXAMPLE B)

The ratio is 6 apples : 4 oranges

Student's answer is incorrect.  
(Student reverses ratio.)

**NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS**

- 12 The manager of a restaurant uses the formula below to decide what to charge for a meal.

$$p = (f \div 3) \times 10$$

In the formula,  $p$  is the price, in dollars, that customers pay for a meal and  $f$  is the food cost to make the meal.

What is the price of a meal if the food cost is \$4.50?

**Scoring Guide:**

| Score | Description  |
|-------|--|
| 1     | correctly finds the price, <b>\$15.00 or 15.00 or 15</b>   |
| 0     | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | no response  |

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 1 (EXAMPLE A)

\$15.00

Student's answer is correct.

SCORE POINT 0 (EXAMPLE A)

\$45.00

\$4.50  
x 10  
-----  
\$45.00

Student's answer is incorrect.

SCORE POINT 0 (EXAMPLE B)

The price of the meal would be \$13.50  
if the food cost \$4.50.

Student's answer is incorrect.

**NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS**

- 13 What is the greatest whole number value of  $n$  that makes this sentence true?

$$3^n < 100$$

Show your work or explain how you know.

**Scoring Guide:**

| Score | Description  |
|-------|--|
| 2     | correct answer, 4, and indication of correct work or explanation   |
| 1     | correct answer without acceptable explanation, or response shows some understanding of exponents and bases     |
| 0     | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | no response  |

**Sample Response:**

4;  $3^4 = 81$ ,  $3^5 = 243$  (higher exponents give results more than 243)



NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 2 (EXAMPLE A)

$3^4 < 100$

$3 * 3 = 9$   
 $9 * 3 = 27$   
 $27 * 3 = 81$   
 $81 * 3 = 243 > 100$

Student's answer is correct with work shown.  
(2 points)

SCORE POINT 2 (EXAMPLE B)

4 is the greatest whole number value.

$3^2 = 9$   
 $3^3 = 27$   
 $3^4 = 81$

Any higher than  $3^4$  would equal over 100 and make the statement  $3^n < 100$  false.

Student's answer is correct with an appropriate explanation. (2 points)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 1 (EXAMPLE A)

3 ( $3^3 < 100$ ) If the exponent is any number larger than 3 then the number would be larger than 100. I found this by trying different exponents:

My Work:

$$3 \times 3 = 9 \times 3 = 27 \times 3 = 81 \times 3 = 243$$

after I hit 243 I knew the exponent had to be 3.

Student's response shows some understanding of exponents and bases (1 point) but answer is incorrect because exponents are one less than they should be (0 points).

SCORE POINT 1 (EXAMPLE B)

N would have to be at most 4. I started with  $3 \times 3 = 6$ .  
 $\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$  is that is 4 threes so far.  $54 \times 3$  is over 100, (164).  
 $\begin{array}{r} 54 \\ \times 3 \\ \hline 162 \end{array}$  that means the answer is 4.

Student's answer is correct (1 point) but explanation contains computational errors (0 points).

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 0 (EXAMPLE A)

The greatest that n can be is 1, because  $3^1$  is equal to 30 and 30 is less than 100. If you did  $3^2$ , it equals 300 and 300 is not less than 100.

right:  $3^1 < 100$  or  $30 < 100$

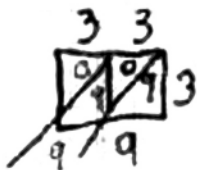
wrong:  $3^2 < 100$  or  $300 < 100$

Student's answer is incorrect and explanation does not demonstrate understanding of exponents and bases. (0 points)

SCORE POINT 0 (EXAMPLE B)

$n = 33$

$3^{33} = 99 < 100$



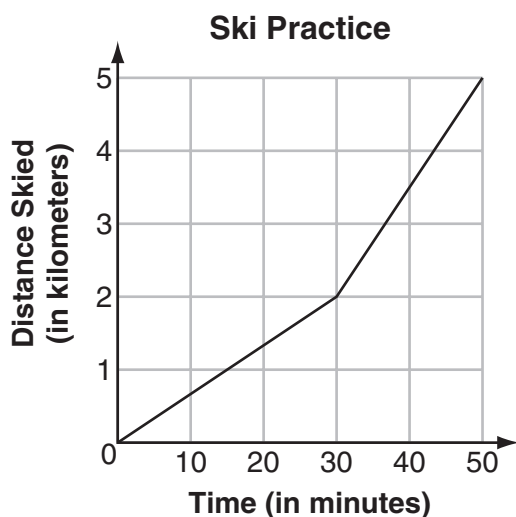
Saying the number has to be whole you can't use decimals.

99 is the closest I could get to with a multiple of 3

Student's answer is incorrect and explanation does not demonstrate understanding of exponents and bases. (0 points)

**NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS**

- 14 The graph below shows the distance Ben skied during a 50-minute practice.



How does Ben's speed during the last 20 minutes of the practice compare with his speed during the first 30 minutes? Explain your answer.

**Scoring Guide:**

| Score | Description  |
|-------|--|
| 2     | correct answer and explanation   |
| 1     | correct answer<br>OR<br>incorrect or missing answer with explanation indicating understanding of relation of slope and speed |
| 0     | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.               |
| Blank | no response  |

**Sample Responses:**

During the last 20 minutes Ben skied faster than during the first 30 minutes.

This can be seen by the graph segment for the last part being steeper, meaning he covered more distance in a given amount of time.

OR

During the last 20 minutes Ben skied faster than during the first 30 minutes since Ben skied 2 kilometers in 30 minutes but 3 kilometers in only 20 minutes.

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 2 (EXAMPLE A)

Ben's speed in the last 20 minutes was a lot faster than his first 30 minutes, mainly because in the first  $\frac{1}{2}$  hour Ben only went 2 kilometers; but in the last 20 minutes he went 3 kilometers.

Student's answer is correct with appropriate explanation. (2 points)

SCORE POINT 2 (EXAMPLE B)

His speed gets faster. This is because the slope of the line is steeper (//) in the last 20 minutes than the slope of the line (—) in the first 30 minutes. Just look at the graph.

Student's answer is correct with appropriate explanation. (2 points)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 1 (EXAMPLE A)

Ben increases his speed and goes faster than he did before.

Student's answer is correct (1 point) with no explanation (0 points).

SCORE POINT 0 (EXAMPLE A)

In the first 30 minutes of the Practice Ben seemed to be skiing fast and descending at a rapid rate however in the last 20 minutes of the practice run Ben seemed to be moving slower and descending at a slower rate.

Student's answer and explanation are incorrect. (0 points)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 0 (EXAMPLE B)

Ben was at about 1.5 km at  
20 min. Then at 30 mins. His speed  
went to 2 km. So Ben's speed went  
up by .5 km.

Student's answer and explanation are  
incorrect. (0 points)

**NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS**

- 15 Cal said, “All squares are similar to each other.”
- a. Explain how you know whether Cal is or is not correct.

Stu said, “All rectangles are similar to each other.”

- b. Draw two rectangles that prove that Stu’s statement is **false**. Explain your answer.

**Scoring Guide:**

| Score | Description  |
|-------|--|
| 4     | 4 points   |
| 3     | 3 points   |
| 2     | 2 points   |
| 1     | 1 point<br>OR<br>Student shows minimal understanding of similar figures.                                       |
| 0     | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | no response  |

**Training Notes:**

Part a: 2 points for correct answer and full explanation  
OR  
1 point for correct answer and partial explanation

Part b: 2 points for correct drawings and explanation  
OR  
1 point for correct drawings without acceptable explanation

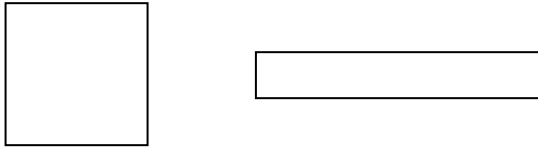


**NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS**

**Sample Response:**

Part a: Cal is correct. All squares have 4 right angles and 4 sides of equal length, so corresponding sides are proportional.

Part b:



The sides of these rectangles are not proportional

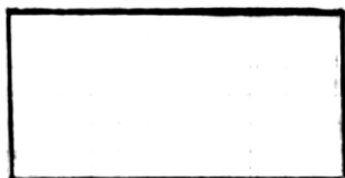
**Note:** In part b, accept any two rectangles that have ratios of sides that are not equal.

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 4 (EXAMPLE A)

a) Cal is correct because all squares have to have 4 equal length sides and all four corners must be  $90^\circ$  angles.

b.



Some rectangles ratios, length and width, are very different.

a) Student's explanation is complete—addresses proportional sides and congruent angles. (2 points)

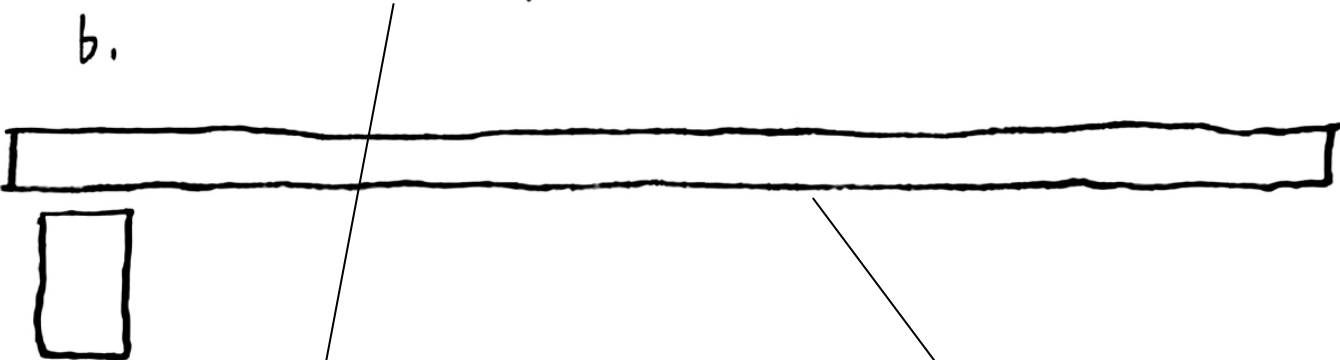
b) Student gives correct drawing and an appropriate explanation. (2 points)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 3 (EXAMPLE A)

a. She is correct because They all have 4 sides the same length  
and 4 Right angles

b.



a) Student's explanation is complete—  
addresses proportional sides and  
congruent angles. (2 points)

b) Student gives correct drawing  
without explanation. (1 point)

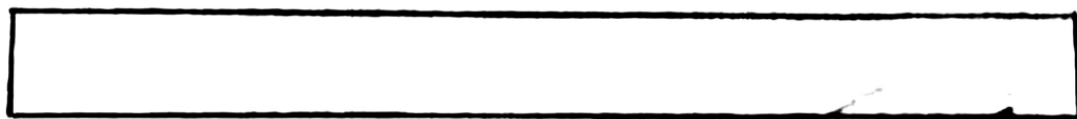
NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 2 (EXAMPLE A)

a) Squares are similar to each other because all squares have equal sides.

b)

a) Student gives a partial explanation—addresses proportional sides but not congruent angles. (1 point)

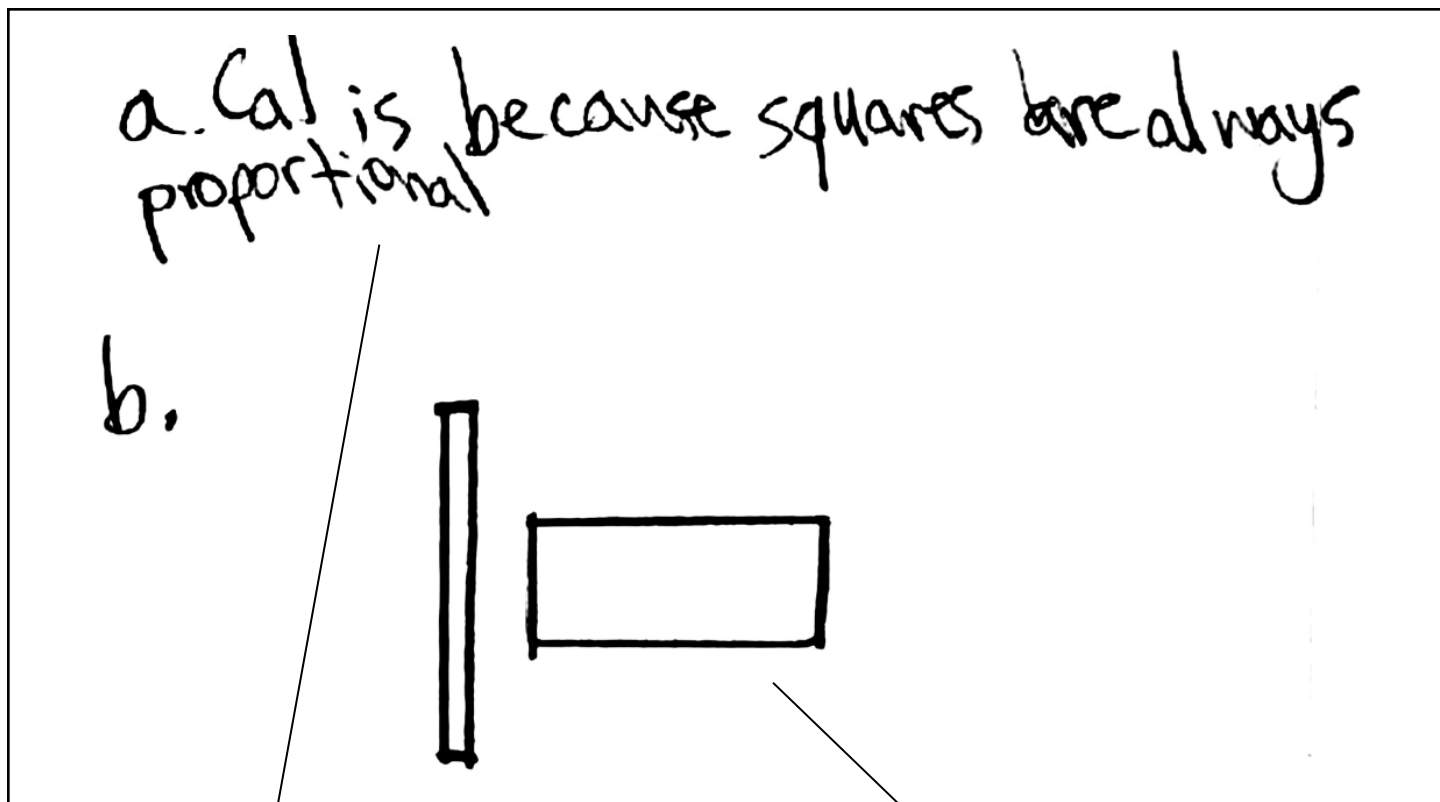


False

b) Student gives correct drawing without explanation. (1 point)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 2 (EXAMPLE B)



a) Student gives a partial explanation.  
(1 point)

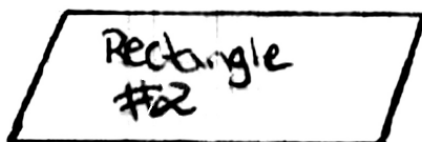
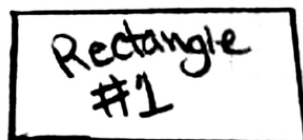
b) Student gives correct drawing  
without explanation. (1 point)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 1 (EXAMPLE A)

A: Cal is correct Because all Squares have to have 4 Sides and all the Sides have to be the Same Size and they have to be Paralell.

B:



a) Student gives a partial explanation—addresses proportional sides but not congruent angles. (1 point)

b) Student's drawing is incorrect. (0 points)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 0 (EXAMPLE A)

A. Cal is right because all squares are equal.

B.

a) Student's explanation is vague. (0 points)



He is wrong because rectangles can be straight or diagonal.


b) Student's drawing is incorrect. (0 points)

NECAP 2005 RELEASED ITEMS  
GRADE 7 MATHEMATICS

SCORE POINT 0 (EXAMPLE B)

(A) I know that squares are all different shapes and sizes so Cal is incorrect because squares are all not the same.

---

(B)  Not all rectangles are the same. So Stu is wrong because rectangles are not all the same.

a) Student's response is incorrect.  
(0 points)

b) Student's drawing is incorrect.  
(0 points)